PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference H38305PC	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2004/014509	International filing date *(day/month/year)* 20.12.2004	Priority date *(day/month/year)* 23.12.2003
International Patent Classification (IPC) or national classification and IPC INV. B01J19/00		
Applicant HTE AKTIENGESELLSCHAFT... et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 10 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 12 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☒	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☒	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
21.10.2005	02.05.2006
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Nazario, L Telephone No. +49 89 2399-8137

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/014509

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3(a) and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4(a))
   - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages	
1-53	as originally filed
Claims, Numbers	
1-55	received on 21.10.2005 with letter of 21.10.2005
Drawings, Sheets	
1/9-9/9	as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has, within the applicable time limit:

   ☒ restricted the claims.

   ☐ paid additional fees.

   ☐ paid additional fees under protest and, where applicable, the protest fee.

   ☐ paid additional fees under protest but the applicable protest fee was not paid.

   ☐ neither restricted the claims nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:

   ☒ complied with.

   ☐ not complied with for the following reasons:

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos. .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	42, 54
	No:	Claims	1-41, 43-53, 55
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-55
Industrial applicability (IA)	Yes:	Claims	1-55
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item I

Basis of the report

The present written opinion has been established has if the priority has been validly claimed and therefore, WO-A-2004/052530 has not been considered as part of the state of the art. However, the applicant's attention is drawn to the fact that this document also describes a device (and method) for carrying out parallel reactions comprising separated reaction spaces, educt feeding and, on the reaction output side, it also comprises a gas feed and a restrictor. (See passages cited in the International Search Report.)

Re Item IV

Lack of unity of invention

1. The following groups of inventions have been found:

   I. Independent claims 1, 2, 19, 30 and 35 (and dependent claims 3-18, 31-34 and 36-40) relate to devices and methods for parallel conduct of at least two chemical reactions comprising at least one common educt feed and, on the outlet side, at least one connection to a gas feed and a restrictor. This latter component is placed downstream of the gas feed connection. The device may also comprise a liquid-gas separation unit.

   II. Independent claims 41 and 49 (and dependent claims 42-48 and 50-55) relate to a device and a method for processing at least one chemical reaction comprising at least one unit for the controlled discharge of a product fluid at high pressure from a fluid separation unit, via a discharge valve and a collecting area that is at a lower pressure than the high pressure fluid separation unit.

2. The only common/corresponding technical feature between the all the independent claims is the provision of a device for the processing or testing of a chemical reaction. Such devices are well known in the art and in particular are disclosed in the documents cited in the International Search report. For example, J. G. Creer et al (abstract, figures), WO03/095087 (abstract, figure 1), WO01/66245 (abstract, figure 11O), R. Randhava et al. (figures), DE19855910 (figure), WO03/078053 (figures) and WO2004/052530

(figures) all disclose devices and methods used in chemical processing or testing.

The only common/corresponding technical feature between independent claims 30, 35, 41 and 49 is the provision of a device for the processing or testing of a chemical reaction comprising a fluid separation unit. Such devices are well known in the art and in particular are disclosed in the documents cited in the International Search report. For example, WO03/095087 (abstract, figure 10, 13), R. Randhava et al. (figures), DE19855910 (figure)) all disclose devices and methods used in chemical processing or testing which comprise a liquid-gas separator so that the resulting product can be further treated.

Furthermore, the two groups solve different technical problems that are not linked by an inventive concept. Group I addresses the problem of how to optimize parallel reactions systems and the second group attempts to solve the problem of how to improve fluid separation.

3. Therefore, the requirements of Rule 13.1 PCT are not fulfilled.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The following documents (D) are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

   D1: CREER J G ET AL: "THE DESIGN AND CONSTRUCTION OF A MULTICHANNEL MICROREACTOR FOR CATALYST EVALUATION" APPLIED CATALYSIS, AMSTERDAM, NL, vol. 22, no. 1, 1986, pages 85-95.
   D2: WO 03/095087 A
   D3: WO 03/078053 A
   D4: WO 01/66245 A
   D5: RANDHAVA R: "ADVANCED CONFIGURATIONS FOR CATALYST RESEARCH" CHEMICAL ENGINEERING PROGRESS, AMERICAN INSTITUTE OF CHEMICAL ENGINEERS. NEW YORK, US, vol. 70, no. 11, November 1983 (1983-11), pages

52-58.

D6: EP-A-1 167 298
D7: EP-A-0 168 301
D8: US-A-4 880 449
D9: GB-A-1 021 050

2. Concerning Group I:

2.1. Independent claim 1 relates to a device comprising at least two reaction spaces having at least one common educt feed for the reaction spaces, or subsets thereof, at least one connection per reactor to a gas feed on the output side and at least one restrictor per reaction space located on the output side and downstream of the gas feed. Independent claim 2 discloses the above features and additionally comprises at least one connection per reaction space to a gas feed on the output side. The restrictor is located downstream of both gas connections. Independent claim 30 comprises the same features of independent claim 1 and additionally comprises a restrictor per reaction space on the input side and at least one gas-liquid separation unit per reaction space. The description (page 21, line 16 to page 22, line 20) defines a restrictor as any component which presents flow resistance against fluid flow, such as multiport valves, needle valves, bores, sintered metal plates, pinholes micromachined channels and frits.

The method claims 19 and 35 relate to the parallel study of at least two chemical reactions in at least two separated reaction spaces comprising the steps of bringing at least one substance to the reaction spaces via a common educt and bringing the product in contact with a gas flow from a gas feed common to all reaction spaces. Independent claim 35 further comprises the step of bringing the product flow into a gas-liquid separator.

2.2. D1-D3 disclose devices and methods for parallel testing of chemical reactions (e.g. catalyst testing of reactions involving hydrocarbon reagents). The devices and methods therein disclosed comprise at least two reaction chambers, a reagent feed system and, on the effluent side, a gas feeding system and at least one restrictor. This latter component is located after the connection of the reactor's output with the additional gas feed. D1 also discloses an additional connection for a standard gas feed. D2 (which

also discloses continuous flow, see for example page 6, lines 10-15) also discloses a gas-liquid separation unit. The restrictors disclosed may be adjustable (e.g. a needle or multiport valve) or fixed (e.g. capillary or frit). The devices also comprise one or more heating systems, so that different parts of the device may be heated (or heated at different temperatures) and they may also be computer controlled. (See passages cited in the International Search Report.)

The applicant's attention is drawn to the fact that the above cited documents disclose devices that comprise the same technical features, in the same relative position, as the presently claimed devices. The processes disclosed in D1-D3 are identical to the ones of the present application.

Therefore, the subject-matter of claims 1-40 is not novel and does not fulfill the requirements of Article 33(2) PCT (see also item VIII - 1.2, 2nd paragraph, of the present report).

2.3. The applicant's attention is drawn to the fact that D4 and D5 also disclose devices for the parallel testing of chemical reactions (see passages cited in the International Search Report). These devices differ from the ones presently claimed in that there is no gas feed connection(s) between the reactor outlet and the restrictor. However, such a modification would be an obvious possibility for the skilled man in the art and would not involve an inventive step. D1-D3 clearly show that the addition of gas to effluents originating from testing reactors is known in the art.

3. Concerning Group II:

3.1. D6-D9 disclose devices for chemical reactions comprising at least one unit for controlled discharge of the product fluid out of a gas-fluid separation unit. These devices comprise a fluid connection (e.g. tube), a discharge valve and a collecting area which is at a lower pressure, for example, at atmospheric pressure. Means for controlling the temperature, pressure, level and flow are also disclosed. The documents clearly disclose that the discharge valve is open or closed according to the level of the fluid in the separation unit. D7 also discloses a system in which the collecting area is also a gas-fluid separation unit operated at a lower pressure. (See passages cited in the International Search Report

and item 1.3 of section VIII of the present opinion.)

Therefore, the subject-matter of claims 41, 43-53 and 55 is not novel and does not fulfill the requirements of Article 33(2) PCT.

3.2. Dependent claims 42 and 54 additionally require that the device comprise at least two reactions and two separation units to be connected in parallel. None of the cited documents discloses this latter feature. However, such a distinguishing feature is banal and cannot substantiate an inventive step. It would be obvious for the skilled man in the art that two or more separation units may be operated in parallel.

Therefore, the subject-matter of claims 42 and 54 does not involve an inventive step and does not fulfill the requirements of Article 33(3) PCT.

3.3. The applicant's attention is drawn to the fact that the use of sensors in order to automate the operation of valves or other equipment is extremely well known in chemical engineering and is routinely used in industry. The use of gas-liquid separators is also well known in parallel testing or processing, see for example D2 and D4.

Re Item VII

Certain defects in the international application

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D9 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII

Certain observations on the international application

1. To fulfill the requirements of article 6 PCT the following have to be addressed:

1.1. Although claims 1, 2 and 30 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only

with regard to the definition of the subject-matter for which protection is sought. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection. A similar objection applies to independent claims 19 and 35.

1.2. Claims 9 and 27 attempt to define the subject-matter in terms of the result to be achieved, it does not contain any technical features (elements of the solution) necessary for achieving the result.

The phrase "the restrictors keep the pressure constant in all reaction spaces even if volume fluctuations exist in the reaction spaces" found in claims 1, 2 and 30 also attempts to define the subject-matter by the result to be achieved.

1.3. In its present formulation independent claim 41 does not clearly define the technical features comprised by the device to which it refers to. It seems that the device only comprises at least one unit suitable for the controlled discharge of a product out of a high pressure fluid separation unit. Such a claim is extremely broad and any valve suitable for high pressure vessels would anticipate it.

1.4. Claim 55 does not contain any additional features of the device it relates to. Furthermore, it is not clear if the claim is directed to a device, to a use, or to a method. The claim should be redrafted so that its subject-matter may be clearly perceived.

1.5. It would increase the intelligibility of the claims if reference signs were added.

2. In the application, certain documents are incorporated by reference. The applicant's attention is drawn to the fact that certain member states may object to this formulation during the regional phase.

PCT/EP2004/014509
hte Aktiengesellschaft the high throughput experimentation company

October 21, 2005
H38305PC MR/HT/dr

New Claims 1 - 55

for further prosecution

(clean copy)

1. Device for the parallel conduct or study of chemical reactions, characterized in that the device comprises at least the following components:

(a) at least two spatially separated reaction spaces;

(b) on the reaction space input side, at least one common educt feed for the reaction spaces according to (a), or for subsets of them;

(d) on the reaction space output side, at least one connection per reaction space to at least one holding gas feed common to all the reaction spaces, or subsets of them;

(e) on the reaction space output side, and downstream of the connection to the holding gas feed according to (d) in the product flow direction, at least one restrictor per reaction space, wherein the restrictors keep the pressure constant in all reaction spaces even if volume fluctuations exist in the reaction spaces.

2. Device for the parallel conduct or study of chemical reactions, characterized in that the device comprises at least the following components:

(a) at least two spatially separated reaction spaces;

(b) on the reaction space input side, at least one common educt feed for the reaction spaces according to (a), or for subsets of them;

(d) on the reaction space output side, at least one connection per reaction space to at least one holding gas feed common to all the reaction spaces;

(d') on the reaction space output side, at least one connection per reaction space to at least one control fluid feed common to all the reaction spaces;

(e) on the reaction space output side, and downstream of the connection to the holding gas feed according to (d) and the connection to the control fluid feed according to (d') in the product flow direction, at least one restrictor per reaction space, wherein the restrictors keep the pressure constant in all reaction spaces even if volume fluctuations exist in the reaction spaces.

3. Device according to Claim 1 or 2, characterized in that the device also comprises at least one other of the following components:

(c) on the reaction space input side, at least one restrictor per reaction space;

(f) at least one unit for analyzing the products from the individual reaction spaces;

(g) at least one common heater for the reaction spaces, and at least one other separate heater for at least one functionally related set of restrictors.

4. Device according to at least one of Claims 1 to 3, characterized in that at least the components (a), (b), (d), (e) and optionally (c) are hermetically connected to one another.

5. Device according to Claim 4, characterized in that the components are hermetically connected to one another even at pressures in excess of 20 bar.

6. Device according to at least one of the preceding claims, characterized in that the components (a), (b), (d), (e) and optionally (c), (d') and (f) are each connected to one another either directly or via channels, tubes or capillaries.

7. Device according to at least one of the preceding claims, characterized in that the common educt feed comprises at least the following components:

(i) at least one supply unit for the at least one educt;

(ii) at least one pressure controller and/or mass flow controller for the at least one educt.

8. Device according to at least one of the preceding claims, characterized in that the common educt feed takes place via a manifold, a bifurcating arrangement of channels, tubes or capillaries with a common node/mixing point, or via an educt feed chamber.

9. Device according to at least one of the preceding claims, characterized in that each restrictor according to (e), and optionally each restrictor according (c), presents a flow resistance in the device resistance at least 50% greater than any other component in the device, apart for all the other restrictors.

10. Device according to at least one of the preceding claims, characterized in that the restrictors according to (e), and optionally the restrictors according to (c), are selected from the group comprising: metal plates with bores, sintered metal plates, pinholes, frits, porous materials, capillaries, micromachined channels.

11. Device according to Claim 10, characterized in that capillaries are used as restrictors, and the average internal diameter of the capillaries is in the range of from 5 µm to 500 µm.

12. Device according to at least one of the preceding claims, characterized in that the volume of each of the reaction spaces is in the range of from 0.1 ml to 50 ml.

13. Device according to at least one of the preceding claims, characterized in that the reaction spaces are designed as reaction channels, and each of them has an inset for holding solids.

14. Device according to at least one of the preceding claims, characterized in that the common holding gas feed comprises at least the following components:

(i) at least one supply unit for the holding gas,

(ii) at least one flow meter,

(iii) at least one pressure controller.

15. Device according to Claim 14, characterized in that all or subsets of the reaction spaces are connected via a connection, which is hermetic up to at least 20 bar, to a holding gas feed common to all the reaction spaces, or subsets of them.

16. Device according to at least one of Claims 2 to 15, characterized in that the common control fluid feed comprises at least the following components:

(i) at least one supply unit for the control fluid,

(ii) at least one mass flow controller,

(iii) downstream (relative to the flow direction of the control fluid) of the mass flow controller, one restrictor per connection of the control fluid feed to the reaction spaces.

17. Device according to at least one of Claims 2 to 16, characterized in that the connections intended to lead from the control fluid feed to the reaction spaces are brought together at a node/mixing point with the connections attached to the reaction spaces on the reaction space output side for discharging the products.

18. Device according to Claim 17, characterized in that the nodes/mixing points for feeding the control fluid are downstream (relative to the flow direction of the control fluid) of the restrictors of the control fluid feed, and also upstream (relative to the flow direction of the product/products) of the restrictors on the reaction space output side [restrictors according to (e)].

19. Method for the parallel conduct or study of at least two chemical reactions in at least two spatially separated reaction spaces, characterized in that the method has at least the following steps:

(A) bringing at least one substance in at least two spatially separated reaction spaces in contact with at least one educt via at least one educt feed common to all the reaction spaces, or subsets of them;

(B) simultaneously bringing at least one product flow from of the at least two spatially separated reaction spaces in contact with a holding gas from a holding gas feed common to all the reaction spaces, or subsets of them.

20. Method according to Claim 19, characterized in that it also comprises at least the following further step:

(C) simultaneously bringing the at least one product flow from of the at least two spatially separated reaction spaces in contact with a control

fluid from a control fluid feed common to all the reaction spaces, or subsets of them.

21. Method according to Claim 19 or 20, characterized in that at least one of the at least two chemical reactions is not a constant volume reaction.

22. Method according to at least one of Claims 19 to 21, characterized in that the educt flows are at least approximately distributed equally over all the reaction spaces by the restrictors upstream of the at least two spatially separated reaction spaces, or by the restrictors downstream of the reaction spaces, or by both.

23. Method according to at least one of Claims 19 to 22, characterized in that volume fluctuations which may occur in the reaction spaces are reduced or compensated for by feeding an inert holding gas via at least one common holding gas feed.

24. Method according to at least one of Claims 19 to 23, characterized in that in start-up operation, that is to say before the at least one chemical reaction has taken place in the reaction spaces, the holding gas from the common holding gas feed is adjusted to a pressure which corresponds approximately to the intended pressure of the reaction spaces while the chemical reactions are taking place, and the educt flow from the common educt feed is subsequently adjusted so that educt flows into the reaction spaces from the common in educt feed.

25. Method according to at least one of Claims 19 to 24, characterized in that the reaction space is loaded with at least one solid, and in that the exposure of the solid to the educt is specified as GHSV in the event that the educt is a gas, or in LHSV units in the event that the educt is a liquid, and in that the GHSV is from 300 h^{-1} to 10,000 h^{-1} or the LHSV is from 0.2 h^{-1} to 10 h^{-1}.

26. Method according to at least one of Claims 19 to 25, characterized in that the pressure in the reaction spaces is in the range of from 2 to 200 bar.

27. Method according to at least one of Claims 19 to 26, characterized in that a pressure drop of at least 10 bar is produced in the restrictors downstream of the reaction spaces in the flow direction.

28. Method according to at least one of Claims 19 to 27, characterized in that a constant non-zero control fluid flow is a adjusted in start-up operation, and the flow of educt through the reactor is respectively reduced or increased by increasing or reducing this control fluid flow when the reaction is taking place, specifically without the pressure in the reaction spaces being significantly affected by this.

29. Method according to at least one of Claims 19 to 28, characterized in that, the method being carried out in a device according to at least one of Claims 1 to 18.

30. Device for the parallel conduct or study of multiphase chemical reactions, characterized in that the device comprises

(a) at least two spatially separated reaction spaces;

(b) on the reaction space input side, at least one common educt feed for the reaction spaces according to (a), or subsets of them;

(b') on the reaction space input side, at least one common educt liquid feed for the reaction spaces according to (a), or subsets of them;

(b'') on the reaction space input side and as part of the connections of the common educt liquid feed to the reaction spaces according to (a), at least one restrictor per connection;

(e') on the reaction space output side and downstream of the connection to an optional control fluid feed, in the flow direction of the at least one product, at least one gas-liquid separation unit per reaction space;

(e'') associated with each gas-liquid separation unit, a connection for discharging the at least one reaction gas;

(e''') per connection according to (e'') and via a node/mixing point, a connection to a common holding gas feed;

(e'''') after the nodes according to (e'''), that is to say downstream in the flow direction of the reaction gas, but before an optional analysis unit, at least one restrictor per connection according to (e''), keeping pressure constant in all the reaction spaces even if volume fluctuations exist in said reaction spaces.

31. Device according to Claim 30, characterized in that the connections of the common educt liquid feed to the at least two reaction spaces are spatially and materially separated from the connections of the common educt feed according to (b) to the reaction spaces.

32. Device according to Claim 30 or 31, characterized in that the device also comprises at least one other of the following components:

(c') on the reaction space input side and associated with the connections of the common educt feed to the at least two reaction spaces, at least one restrictor per reaction space;

(d') on the reaction space output side, at least one connection per reaction space to at least one control fluid feed common to all the reaction spaces;

(f) a t least one unit for analyzing the reaction gases from the individual reaction spaces;

(g) at least one common heater for the reaction spaces, and at least one other separate heater for at least one set of restrictors.

33. Device according to at least one of Claims 30 to 32, characterized in that at least one of the reaction spaces according to (a) is designed as a gas-liquid-solid reactor.

34. Device according to at least one of Claims 30 to 33, characterized in that the gas-liquid separation units are precipitators and/or condensers, and the gas-liquid-solid reactor is a trickle bed reactor.

35. Method for the parallel conduct or study of at least two chemical reactions in at least two spatially separated reaction spaces, characterized in that the method has at least the following steps:

(A') bringing at least one substance per reaction space in at least two spatially separated reaction spaces in contact with at least one educt via at least one educt feed common to all the reaction spaces, or subsets of them, and with at least one educt liquid via at least one educt liquid feed common to all the reaction spaces, or subsets of them;

(B') simultaneously bringing the at least one reaction gas flowing out of each gas-liquid separation unit in contact with a holding gas from a holding gas feed common to all the gas-liquid separation units;

(D) introducing the product flows flowing out of the reactor into at least one gas-liquid separation unit per reaction space.

36. Method according to Claim 35, characterized in that it comprises at least one further step:

(C') simultaneously bringing the at least one product flow from at least two spatially separated reaction spaces in contact with a control fluid from a control fluid feed common to all the reaction spaces.

37. Method according to Claim 36, characterized in that the control fluid is a gas and this gas is not only used for controlling the flows through the reaction spaces, but also contributes to stripping gases and volatile substances which may be dissolved in the liquid phases emerging from the reaction spaces in the gas-liquid separation unit.

38. Method according to at least one of Claims 35 to 37, the method being carried out in a device according to at least one of Claims 30 to 34.

39. Use of the device according to at least one of Claims 1 to 18 or 30 to 34, or of a method according to at least one of Claims 19 to 29 or 35 to 38, for at least one standard petrochemical reaction.

40. Use according to Claim 39, characterized in that the at least one reaction is selected from the reaction classes of hydroprocessing, hydrocracking, desulfurization (HDS), denitrogenation (HDN), oligomerizations, polymerization reactions, aromatization reactions, hydrogenations, Fischer-Tropsch reactions.

41. Device for the processing or testing of at least one chemical reaction, comprising at least one unit for the controlled discharge of product fluid out of at least one high pressure end fluid separation unit, wherein said fluid separation unit is in fluid connection, via a discharge valve, with a collecting area that is at a lower pressure than the high pressure fluid separation unit.

42. Device according to claim 41, characterized in that at least two reactions run in parallel and that at least two fluid separation units, either on the high or at the low pressure end, or both, are connected in parallel.

43. Device according to claim 41 or 42, characterized in that at least one discharge valve is positioned at the bottom side of at least one fluid separation unit on the high pressure end.

44. Device according to any one of claims 41 to 43, characterized in that the collecting area for the product fluid is a fluid separation unit located at the low pressure end with respect to the high pressure end fluid separation unit.

45. Device according to any one of claims 41 to 44, characterized in that at least one fluid separation unit contains a fluid level sensor.

46. Device according to any one of claims 41 to 45, characterized in that the device contains means for regulating pressure or fluid flow or both.

47. Device according to any one of claims 41 to 46, characterized in that the discharge valve, the fluid level sensor and the means for regulating pressure or fluid flow are connected to a computer-based control unit.

48. Device according to any one of claims 41 to 47, characterized in that at least one high pressure end fluid separation unit is suited for accommodating product fluid having a volume ranging from 0.1 ml to 140 ml.

49. Method for the controlled discharge of product fluid out of a high pressure end separation unit that is part of a device for the processing or testing of at least one chemical reaction, comprising at least the following steps:

(i) opening of a discharge valve triggered by the signal of a level sensor in at least one separation unit;

(ii) discharging of the product fluid from the at least one separation unit, via said discharge valve, into at least one collecting area;

(iii) closing of said discharge valve, triggered by a signal corresponding to a change in pressure and/or a change in fluid flow.

50. Method according to claim 49, further comprising at least the following step:

(iv) directing gaseous product flow through the collecting area.

51. Method according to claim 49 or 50, further comprising the following step:

(v) directing the product fluid of the collecting area to an analysis system.

52. Method according to one of claims 50 or 51, wherein the gaseous product from the high pressure end separation unit is directed into the low pressure end separation unit by means of a dip pipe or a tube.

53. Method according to one of claims 50 to 52, wherein the gaseous product coming from the low pressure end separation unit is directed to an analysis system.

54. Method according to any one of claims 49 to 53, wherein at least two separation units are operated in parallel.

55. Device according to claims 41 to 48 to be used in conjunction with a device according to claims 1 to 18 or 30 -34; or use of the method according to claims 49 to 54 to be used in combination in a method according to claims 19 to 29 or 35 to 38.